

Cooking with Moist Heat



A Self-Study Course
by
KidCare Nutrition Sponsor

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1-Hour of
Healthy and Safe Environment
Training Credit

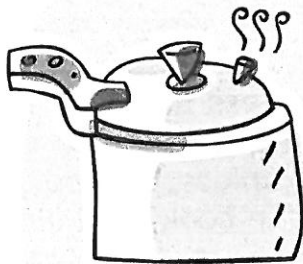
The methods of cooking with moist heat, that is, through the medium of water, are boiling, simmering, steaming, dry steaming, and braising. In every one of these processes, the effect of moist heat on food is entirely different from that of dry heat. However, the method to be selected depends to a great extent on the amount of water that the food contains. To some foods much water must be added in the cooking process; to others, only a little or none at all. If food is not placed directly in large or small quantities of water, it is cooked by contact with steam or in a utensil that is heated by being placed in another containing boiling water, as, for example, a double boiler.

As water is such an important factor in cooking with moist heat, something concerning its nature and use should be understood. Therefore, before considering the moist heat cooking processes in detail, let's look at the function of water in the body and in cooking and also the kinds of water.

FUNCTION IN THE BODY - Water supplies no energy to the body, but it plays a very important part in nutrition. In fact, its particular function in the body is to act as a solvent and a carrier of nutritive material and waste. In doing this work, it keeps the liquids of the body properly diluted, increases the flow of the digestive juices, and helps to carry off waste material. However, its ability to perform these necessary functions in the right way depends on its quality and its safety.

KINDS OF WATER - Water is either hard or soft. As it falls from the clouds, it is pure and soft until it comes in contact with gases and solids, which are dissolved by it and change its character. It is definitely known that the last of the water that falls during a rain shower is much better than the first, as the first cleanses not only the air, but the roofs and other things with which it comes in contact. In passing through certain kinds of soil or over rocks, water dissolves some of the minerals that are contained there and is thus changed from soft to hard water. If sewage drains into a well or water supply, the water is liable to contain bacteria, which will render it unfit and unsafe for drinking until it is sterilized by boiling. Besides rain water and distilled water, there is none that is entirely soft; all other waters hold certain salts in solution to a greater or less degree.

The quality of hardness, which is present in nearly all water, is either temporary or permanent. Water is temporarily hard when it contains soluble lime, which is precipitated, that is, separated from it, upon boiling. Every person who regularly uses a teakettle is familiar with this condition. The lime precipitated day after day clings to the sides of the vessel in which the water is boiled, and in time they become very thickly coated. Permanent hardness is caused by other compounds of lime that are not precipitated by boiling the water. The only way in which to soften such water is to add to it an alkali, such as borax, washing soda, or bicarbonate of soda.



USES OF WATER IN COOKING – It is the solvent, or dissolving, power of water that makes this liquid valuable in cooking, but of the two kinds, soft water is preferable to hard, because it possesses a greater solvent power. This is due to the fact that hard water has already dissolved a certain amount of material and will therefore dissolve less of the food substances and flavors when it is used for cooking purposes than soft water, which has dissolved nothing. It is known, too, that the flavor of such beverages as tea and coffee is often greatly impaired by the use of hard water. Dried beans and peas, cereals, and tough cuts of meat will not cook tender so readily in hard water as in soft, but the addition of a small amount of baking soda during the cooking of these foods will assist in softening them.

Water is used in cooking chiefly for extracting flavors, as in the making of coffee, tea, and soups; as a medium for carrying flavors and foods in such beverages as lemonade and cocoa, for softening both vegetable and animal fiber; and for cooking starch and dissolving sugar, salt, gelatin, etc. In accomplishing much of this work, water acts as a medium for conveying heat.

BOILING – As applied to cooking, boiling means cooking foods in boiling water. Water boils when its temperature is raised by heat to what is commonly termed its boiling point. This varies with the atmospheric pressure, but at sea level, under ordinary conditions, it is always 212 degrees Fahrenheit. When the atmospheric pressure on the surface of the water is lessened, boiling takes place at a lower temperature than that mentioned, and in extremely high altitudes the boiling point is so lowered that to cook certain foods by means of boiling water is difficult. As the water heats in the process of boiling, tiny bubbles appear on the bottom of the vessel in which it is contained and rise to the surface. Then, gradually, the bubbles increase in size until large ones form, rise rapidly, and break, thus producing constant agitation of the water.

Boiling has various effects on food. It toughens the albumin in eggs, toughens the fiber and dissolves the connective tissues in meat, softens the cellulose in cereals, vegetables, and fruits, and dissolves other substances in many foods. A good point to bear in mind in preparing foods by boiling is that slowly boiling water has the same temperature as rapidly boiling water and is therefore able to do exactly the same work. Keeping the gas burning full heat or running the fire hard to keep the water boiling rapidly is therefore unnecessary; besides, it wastes fuel without doing the work any faster and sometimes not so well. However, there are several factors that influence the rapidity with which

water may be brought to the boiling point; namely, the kind of utensil used, the amount of surface exposed, and the quantity of heat applied. A cover placed on a saucepan or a kettle in which food is to be boiled retains the heat, and thus causes the temperature to rise more quickly; besides, a cover so used prevents a loss of water by condensing the steam as it rises against the cover. As water boils, some of it constantly passes off in the form of steam, and for this reason syrups or sauces become thicker the longer they are cooked. The evaporation takes place all over the surface of the water; consequently, the greater the surface exposed, the more quickly is the quantity of water decreased during boiling. Another point to observe in the boiling process is that foods boiled rapidly in water have a tendency to lose their shape and are reduced to small pieces if allowed to boil long enough.

Besides serving to cook foods, boiling also renders water safe, as it destroys any germs that may be present. This explains why water must sometimes be boiled to make it safe for drinking. Boiled water, as is known, loses its good taste. However, as this change is brought about by the loss of air during boiling, the flavor can be restored and air again introduced if the water is shaken in a partly filled jar or bottle, or beaten vigorously for a short time with an egg beater.

SIMMERING OR STEWING - The cooking process known as simmering, or stewing, is a modification of boiling. By this method, food is cooked in water at a temperature below the boiling point, or anywhere

from 185 to 200 degrees Fahrenheit. Water at the simmering point always moves gently--never rapidly as it does in boiling. Less heat and consequently less fuel are required to cook foods in this way, unless, of course, the time consumed in cooking the food at a low temperature is much greater than that consumed in cooking it more rapidly.



Aside from permitting economy in the use of fuel, simmering, or stewing, cooks deliciously certain foods that could not be selected for the more rapid methods. For example, tough cuts of meat and old fowl can be made tender and tasty by long cooking at a low temperature, for this method tends to soften the fiber and to develop an excellent flavor. Tough vegetables, too, can be cooked tender by the simmering process without using so much fuel as would be used if they were boiled, for whatever method is used they require long cooking. Beets, turnips, and other winter vegetables should be stewed rather than boiled, as it is somewhat difficult to cook them tender, especially in the late winter and early spring. If dry beans and peas are brought to the simmering point and then allowed to cook, they can be prepared for the table in practically the same length of time and without so much fuel as if they boiled continuously.

STEAMING - As its name implies, steaming is the cooking of food by the application of steam. In this cooking process, the food is put into a steamer, which is a cooking utensil that consists of a vessel with a perforated bottom placed over one containing water. As the water boils, steam rises and cooks the food in the upper, or perforated, vessel. Steamers are sometimes arranged with a number of perforated vessels, one on top of the other. Such a steamer permits of the cooking of several foods at the same time without the need of additional fuel, because a different food may be placed in each vessel.

Steaming is preferable to boiling in some cases, because by it there is no loss of mineral salts or food substances; besides, the flavor is not so likely to be lost as when food is boiled. Vegetables prepared in this way prove very palatable, and very often variety is added to the diet by steaming bread, cake, and pudding mixtures and then, provided a crisp outside is desired, placing them in a hot oven to dry out the moist surface.

DRY STEAMING - Cooking foods in a vessel that is suspended in another one containing boiling water constitutes the cooking method known as dry steaming. The double boiler is a cooking utensil devised especially for carrying on this process. The food placed in the suspended, or inner, vessel does not reach the boiling point, but is cooked by the transfer of heat from the water in the outside, or lower, vessel. A decided advantage of this method is that no watching is required except to see that the water in the lower vessel does not boil away

completely, for as long as there is water between the food and the fire, the food will neither boil nor burn.

Because of the nature of certain foods, cooking them by this process is especially desirable. The flavor and consistency of cereals and foods containing starch are greatly improved by long cooking in this way. Likewise, custards and mixtures containing eggs can be conveniently cooked in a double boiler, because they do not require a high temperature; in fact, their texture is spoiled if they are cooked at the boiling point. To heat milk directly over the flame without scorching it is a difficult matter, and, on the other hand, boiled milk is hard to digest. Because of these facts, food containing milk should not be boiled, but should be cooked at a lower temperature in a double boiler.

BRAISING - Cooking meat in an oven in a closed pan with a small quantity of water constitutes braising. This cooking process might be called a combination of stewing and baking, but when it is properly carried out, the meat is placed on a rack so as to be raised above the water, in which may be placed sliced vegetables. In this process the meat actually cooks in the flavored steam that surrounds it in the hot pan. The so-called double roasting pans are in fact braising pans when they are properly used. A pot roast is the result of a modification of the braising method.

PERFECT HARD BOILED EGGS

1. Put eggs in pan of water so that water covers eggs by 1-2 inches and bring to a boil.
2. As soon as eggs boil, turn off flame, remove from heat, **cover**, and let sit for 10 minutes exactly.
3. Add plenty of cold water to pan to stop cooking.
4. At this point you can drain and peel them for eating or recipes or put them into the fridge for a later use.

DILLED CARROTS (STEAMED)

3 cups sliced carrots or whole baby carrots

1/2 tsp. lemon pepper

2 tsp. fresh dill, minced

2 tsp. olive oil

Fresh ground pepper and salt to taste

Steam carrots until tender, about 5-6 minutes. Combine with other ingredients.

BRAISED BEEF AND ONIONS

2 (2-lb) well-marbled boneless beef chuck pot roasts (1 1/2 inches thick)

2 teaspoons ground allspice

1 1/2 lb onions, halved lengthwise, then thinly sliced lengthwise (6 cups)

6 large garlic cloves, finely chopped

2 tablespoons finely chopped fresh flat-leaf parsley

Special equipment: heavy-duty foil

Put oven rack in middle position and preheat oven to 400°F.

Pat meat dry. Stir together allspice, 2 teaspoons salt, and 1 teaspoon pepper in a small bowl and rub all over meat. Spread half of onions and half of garlic in a 13- by 9-inch roasting pan and arrange meat on top. Spread remaining onions and garlic over meat. Tightly cover pan with foil and roast, turning meat over after 1 hour, until meat is very tender, about 2 1/2 hours total. Skim fat from pan juices. Slice meat across the grain and sprinkle with parsley. Serve with onions and pan juices.

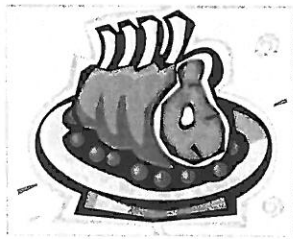
Cooks' note:

Beef can be braised 2 days ahead. Cool meat in juices, uncovered, then slice and chill in juices, covered. Reheat, covered, in a 350°F oven 30 to 40 minutes.

MOIST HEAT

Hot Water Immersion (Liquid and Steam)

32°F	Shock	Placing hot food into cold water
160°F - 180°F	Poach	Normally fish, meat or eggs
185°F - 205°F	Simmer	Heated just enough so that a few bubbles rise to the surface.
< 212°F	Scald	Normally milk, heated to a point just before boiling, should be very hot, but not boiling
	Coddle	For a short time
	Brew, Steep, Infuse	Normally ground beans or leaves
212°F (at sea level)	Blanch	Normally fruits and vegetables, submerged for a very short time then moved to cold water
	Parboil	Or partially cooked
	Al Dente	Normally pasta, cooked on outside but just undercooked on the inside
	Boil	Cooked
	Reduce	Liquid evaporated over time
212°F	Steam	Using only the vapor
	Double Boil	Steam heats 2nd container with food product
250°F +	Pressure Cook	Uses a special container which can contain steam at a higher pressure and having a valve to ensure that the pressure doesn't go too high.



Pressure Cooking

Normally water boils at about 212° F (100 C), give or take depending upon your altitude. When pressure comes into play, however, the water boils at 250° F (120° C.). At this temperature, the fibers in food (like meat or dry beans) tenderize in about 1/3 of their traditional cooking time. Additionally, because of shorter cooking times, more nutrients, natural color, and flavor are retained in the cooked food, instead of leaching out when exposed to prolonged cooking.

Cooking under pressure enables you to prepare food quickly, nutritiously, and deliciously. The following points explain how this is possible.

Pressure When water (or any liquid) boils, it produces steam. When the steam is not allowed to escape, pressure builds inside the cooker. Under pressure, cooking temperatures can be raised significantly higher than possible under normal conditions. At 15 lbs. pressure, for example, the temperature inside the pressure cooker reaches 250 degrees.

Steam The super-heated steam created by these heightened temperatures results in high-speed cooking (3 to 10 times faster than other conventional methods). This super-heated steam actually intensifies natural flavors, so you can use less salt, less sugar, fewer additives, fewer heavy seasonings, and still get great taste.

Nutrients Pressure cooking also retains more valuable nutrients than other cooking methods. Because foods cook quickly in an almost airless environment, and with very little liquid, vitamins, minerals, and other nutrients aren't boiled away during cooking.

Low-Fat Pressure cooking is virtually fat-free cooking, as well. Foods are cooked in a steam atmosphere. And using the cooking rack in the pressure cooker to keep foods out of the cooking liquid means fats already in foods can be cooked out and drained away.

7. The advantage of steaming vegetables is

8. Which two methods of cooking tough cuts of meat and root vegetables will give you the tastiest and most satisfying dish-

Steaming Boiling Braising
Stewing Dry Steaming Simmering Baking

9. The quality of hardness in water is either permanent or temporary.

a. Boiling water will not do away with the permanent hardness in water. Softening this water can only be done by

b. _____ is found in water that is found to be temporarily hard.

10. When braising a cut of meat, what is it that's actually cooking the meat besides the heat of the stove?

11. What effect does cooking in a pressure cooker have on foods?